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1: N Z Med J 1996 Sep 27;109(1030):363-5 Related Articles, Links

Accidental self inoculation with oil based veterinary vaccines.

Jones DP.

Department of Orthopaedic Surgery, Dunedin Hospital.

PubMed Services

AIMS: To report the adverse local effects of inadvertent self inoculation with oil-based veterinary vaccines. METHODS: Three case reports and a literature review. RESULTS: One patient developed extensive chronic granulomatous inflammation in the thigh following intramuscular injection of Footvax vaccine requiring major surgical debridements. The other two cases developed chronic inflammation and sterile abscess formation following subcutaneous injections in the hand, requiring surgical drainage and corticosteroids to eventually heal. CONCLUSIONS: The mineral oil used as an adjuvant in veterinary vaccines can cause a prolonged chronic granulomatous reaction with sterile abscess formation. Surgical debridement may be required to remove the oil to prevent chronic sequelae. Oral corticosteroids should be considered once infection has been excluded.

Related Resources

PMID: 8890863 [PubMed - indexed for MEDLINE]

1: Ann Med Interne (Paris) 1996;147(1):10-4 Related Articles, Links

[Side effects of influenza vaccination in patients over 60 years of age]

[Article in French]

Gauthey L, Martin R, Herrmann F, Karsegard J, Michel JP.

Institutions Universitaires de Geriatrie, Geneve, Suisse.

The purpose of this study was to investigate the various factors affecting the incidence of adverse reactions after influenza immunization with either a subunit or an inactivated whole-virus vaccine. A total of 1,959 nursing home residents in Geneva (mean age: 84 +/- 8 years, sex ratio: 3F/1M) were randomly allocated to the two vaccine groups. Results showed that the incidence of local adverse reactions could be reduced by using the subunit vaccine injected into the buttock or the internal aspect of the thigh, in preference to the deltoid muscle. Moreover, this study demonstrated that intramuscular injection lowers the risk of local reactions but tends to increase the incidence of general reactions. Implementation of these recommendations should reduce the frequency of side effects due to influenza vaccination and, consequently, raise the rate of acceptance and the immunization coverage of the populations exposed to risk.

Publication Types:
- Clinical Trial
- Randomized Controlled Trial

PMID: 8763084 [PubMed - indexed for MEDLINE]

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Efficacy of Pasteurella haemolytica subunit antigens in a goat model of pasteurellosis.

Purdy CW, Straus DC, Struck D, Foster GS.

USDA, Conservation and Production Research Laboratory, Bushland, TX 79012.

The effectiveness of Pasteurella haemolytica biovar A, serovar 1 (Ph1) subunit vaccines was tested in goats, using challenge exposure by transthoracic injection. Twenty-two weanling male Spanish goats were randomly allotted to 4 groups. Six goats were given 2 transthoracic injections into the lung 18 days apart with live Ph1 impregnated in agar beads (positive controls). Six goats were not given injections (negative controls). Five goats were given 2 transthoracic injections into the lung 18 days apart with 4.6 mg of cytotoxin in agar beads. The remaining 5 goats were given 2 IM injections, 18 days apart, into the thigh with 4.6 mg of cytotoxin emulsified in incomplete Freund's adjuvant. Twenty-four days after the second injection, all goats were challenge-exposed to live Ph1 by transthoracic injection into the lung, and 4 days later, all goats were euthanatized and necropsied. Serum neutralizing anticytotoxin titer was measured throughout the experiment. Mean volume of consolidated lung tissue was 0.38 cm3 for the positive control group, 32 cm3 for the negative control group; 19 cm3 for the cytotoxin-lung group; and 88 cm3 for the cytotoxin-adjuvant-IM group. Only the positive control group was protected from Ph1 challenge exposure. The Ph1 cytotoxin subunit vaccine alone appeared to be ineffective, and the anticytotoxin titer was not correlated with protection. In a separate trial, 32 weanling male Spanish goats were randomly allotted to 5 groups. Each was given 2 transthoracic injections into the lung 22 days apart. Six goats were given Ph1 cytotoxin impregnated into agar beads; 6 were given Ph1 lipopolysaccharide impregnated in agar beads; 6 were given Ph1 capsule impregnated in agar beads. Six goats were given agar beads only (negative controls), and 6 were given live Ph1 impregnated into agar beads (positive controls). Twenty days after the second injection, all goats were challenge-exposed to live Ph1 by transthoracic injection into the lung, and 4 days later, all goats were euthanatized and necropsied. Mean volume of consolidated lung tissue was 0.14 cm3 for the positive control group, 7.59 cm3 for the negative control group, 11.21 cm3 for the cytotoxin group, 10.19 cm3 for the lipopolysaccharide group, and 1.6 cm3 for the capsule group. Again, only injection of live Ph1 (positive controls) induced solid protection; however, the capsule subunit vaccine induced partial protection against challenge exposure in this trial. Lipopolysaccharide and cytotoxin subunit vaccines were

Quantitative measurement of muscle and subcutaneous fat thickness in newborn by real-time ultrasonography: a useful method for site and depth evaluation in vaccination.

Lo YS, Lu CC, Chen LY, Huang LY, Jong YJ.

Department of Pediatrics, Kaohsiung Medical College Hospital, Taiwan, Republic of China.

In order to quantify muscle thickness and choose the appropriate site for intramuscular injection of vaccines in neonates, we used ultrasonography to measure muscle and subcutaneous fat thickness of anterolateral mid-thigh, upper outer quadrant of buttock and middle area of deltoid in fifty full term (group 1) and thirty low birth weight (group 2) infants. A Hitachi EUB40 real-time scanner and a 5 MHz transducer was used in the study. We delineated the normal distribution of muscle and subcutaneous fat thickness in mid-thigh, buttock and deltoid areas of full term and low birth weight infants. There was no significant difference between male and female infants in the two groups. Muscle and subcutaneous fat thickness in the thigh area was 11.8 +/- 1.9 mm and 3.8 +/- 0.4 mm, respectively, in group 1; 8.6 +/- 1.7 mm and 2.7 +/- 0.5 mm in group 2. Figures in the buttock area were 10. 1 +/- 1.5 mm and 3.7 +/- 0.5 mm in group 1, 6.9 +/- 1.2 mm and 2.7 +/- 0.7 mm in group 2; and in the deltoid area were 5.2 +/- 0.7 mm and 3.4 +/- 1.5 mm in group 1 and 3.8 +/- 0.8 mm and 2.3 +/- 0.6 mm in group 2. There was significant logarithmic correlation between muscle thickness and body weight (r = 0.6, 0.8, 0.6) and muscle thickness and body length (r = 0.4, 0.6, 0.6) in thigh, buttock and deltoid areas of the low birth weight infants. In contrast, there was significant logarithmic correlation only between buttock muscle and body weight (r = 0.5) in the full term infants.(ABSTRACT TRUNCATED AT 250 WORDS)

PMID: 1404527 [PubMed - indexed for MEDLINE]

1: J Community Health Nurs 1992;9(2):87-94 Related Articles, Links

Injection sites utilized for DPT immunizations in infants.

Daly JM, Johnston W, Chung Y.

The purpose of this investigation was to determine the site utilized by nurses for administering Diphtheria and Tetanus Toxoids and Pertussis (DPT) injections to infants under 7 months of age. Twenty-six of the 28 agencies identified in a metropolitan area as administering DPT injections chose to participate in the study. Those individuals administering DPT injections in the agencies completed a questionnaire with a return rate of 69% (n = 55). Forty-four participants indicated that they used the anterolateral thigh, the recommended site, 100% of the time. The participants in the study administered a total of 1,453 DPT injections per month. Eighty-seven percent of those injections were administered in the anterolateral thigh, 3.6% were given in the deltoid, 5.1% were given in the dorsal gluteal, and 4% were given in the ventrogluteal. The estimated proportion of DPT injections administered at the correct site was 84.65% which is much lower than the critical value 94.06% for alpha = .05 (p less than .00001).

PMID: 1624982 [PubMed - indexed for MEDLINE]

Controlled trial of Haemophilus influenzae type B diphtheria toxoid conjugate combined with diphtheria, tetanus and pertussis vaccines, in 18-month-old children, including comparison of arm versus thigh injection.

Scheifele D, Bjornson G, Barreto L, Meekison W, Guasparini R.

Vaccine Evaluation Center, University of British Columbia, Vancouver, Canada.

A randomized, controlled comparison was made in 175 healthy 18-month-old children given either diphtheria and tetanus toxoids and pertussis vaccine, adsorbed (DTP) and haemophilus b diphtheria toxoid conjugate vaccine (PRP/D) concurrently at separate sites (66 children) or a new vaccine combining these products (109 children). Rates of local or systemic adverse effects postimmunization and antibody responses to each component did not differ significantly between groups. DTP-containing vaccines were better tolerated when given in the thigh than in the arm. The combination DTP-PRP/D vaccine performed satisfactorily at 18 months of age, avoiding the inconvenience of two injections.

Publication Types:
- Clinical Trial
- Randomized Controlled Trial

PMID: 1609548 [PubMed - indexed for MEDLINE]

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1: Pediatrics 1989 May;83(5):679-82

Related Articles, Links

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Comment in:

- Pediatrics. 1990 Jan;85(1):134-5.

Adverse reactions to diphtheria, tetanus, pertussis-polio vaccination at 18 months of age: effect of injection site and needle length.

Ipp MM, Gold R, Goldbach M, Maresky DC, Saunders N, Greenberg S, Davy T.

Department of Pediatrics, Faculty of Medicine, University of Toronto, Ontario, Canada.

Related Resources

Adverse reactions after diphtheria, pertussis, tetanus, polio vaccination at 18 months of age were investigated in three groups: 74 children injected in the deltoid muscle with a 16-mm (5/8-in) needle, 64 in the anterolateral thigh with a 16-mm needle, and 67 in the anterolateral thigh with a 25-mm (1-in) needle. No significant differences in systemic reactions were observed. Severe pain occurred in 30.5% of the groups injected in the thigh compared with only 8.1% of the group injected in the arm (P less than .001). Children vaccinated in the thigh had decreased movement of the extremity significantly more often than those injected in the arm (49.9% v 25.6%, P less than .0005), and two thirds of the former limped for 24 to 48 hours. Redness and swelling were observed more often after injection in the arm than in the thigh (58.1% v 26.7%, P less than .0005). The only effect of changing needle length in the groups injected in the thigh was the occurrence of more redness and swelling in children vaccinated with the 16-mm needle compared with the 25-mm needle. Overall, parents rated more reactions as moderate to severe among children injected in the thigh than among children injected in the arm (64.2% v 37.9%, P less than .001). The deltoid muscle appears to be the preferred site for administration of diphtheria, pertussis, tetanus, polio vaccine at 18 months of age.

PMID: 2717284 [PubMed - indexed for MEDLINE]

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#13	Search **vaccine and qaudriceps** Limits: **Publication Date to 1998/06/26**	08:04:51	74873
#8	Search **vaccine and qaudriceps injection** Limits: **Publication Date to 1998/06/26**	08:01:12	5822
#4	Search **HIV and qaudriceps injection** Limits: **Publication Date to 1998/06/26**	08:00:48	1572
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L4	intramucsular and L3	0	L4
L3	HIV and L1	207	L3
L2	HIV and L1L1	0	L2
L1	quadriceps and vaccine	323	L1

END OF SEARCH HISTORY

L9 ANSWER 8 OF 16 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1993:260791 CAPLUS
DOCUMENT NUMBER: 118:260791
TITLE: Sn-chlorin e6 antibacterial immunoconjugates. An in vitro and in vivo analysis
AUTHOR(S): Lu, Xiao-Ming; Fischman, Alan J.; Stevens, Emily; Lee, Thomas T.; Strong, Louis; Tompkins, Ronald G.; Yarmush, Martin L.
CORPORATE SOURCE: Surg. Ser., Dep. Chem., Biochem. Eng., Rutgers Univ., Piscataway, NJ, 08854, USA
SOURCE: Journal of Immunological Methods (1992), 156(1), 85-99
CODEN: JIMMBG; ISSN: 0022-1759
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Monoclonal antibody-Sn-chlorin e6 immunoconjugates were prepd. by the site-selective covalent modification of the monoclonal oligosaccharide moiety. By carefully controlling the reaction conditions and introducing triethanolamine groups as axial ligands of the Sn moiety, conjugates with in vivo biodistribution properties similar to underivatized IgG were prepd. By varying the reaction conditions, conjugates were reproducibly prepd. with a range of photosensitizer to mAb molar ratios from 1.6 to 10.

Based on a competitive inhibition RIA, conjugates prepd. by this method showed selectivity and binding affinity comparable to the unmodified antibody. The immunoconjugates had only slightly lower singlet oxygen yields than that obsd. with the Sn-chlorin e6 precursor indicating that negligible aggregation or structural modification of the chromophores occurred during the synthesis process. In vitro cell killing expts. demonstrated that all conjugates possessed significant cytotoxic activity.

Biodistribution studies in mice showed that conjugates prepd. with axial ligands had significant serum retention 24 h after **injection** while conjugates prepd. without the triethanolamine ligand were much more rapidly cleared. In vivo specificity was demonstrated using rats infected with Fisher immunotype I P. aeruginosa at a site in the left posterior **thigh** muscle. Target to background ratios exceeded 60 at 120 h after conjugate **injection** of the specific immunoconjugate, compared to a ratio of only 6 for a non-specific mouse IgG conjugate. Biodistribution patterns at 120 h post **injection** indicate that the conjugates were both biol. active and structurally intact.

L9 ANSWER 6 OF 16 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1997:59715 CAPLUS
DOCUMENT NUMBER: 126:102765
TITLE: Randomized trial of the effect of co-administration with acellular pertussis DTP vaccine on immunogenicity of Haemophilus influenzae type b conjugate vaccine
AUTHOR(S): Eskola, Juhani; Olander, Rose-Marie; Hovi, Tapani; Litmanen, Leila; Peltola, Sara; Kayhty, Helena
CORPORATE SOURCE: National Public Health Institute, Helsinki, 00300, Finland
SOURCE: Lancet (1996), 348(9043), 1688-1692
CODEN: LANCAO; ISSN: 0140-6736
PUBLISHER: Lancet
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Inclusion of new vaccines in vaccination programs for children would be easier if they could be combined with existing vaccines. Vaccines contg. acellular pertussis in the diphtheria/tetanus/pertussis (DTP-a) combination are expected to replace the conventional whole-cell vaccines (DTP-w). We tested the immunogenicity and safety of a combination of DTP-a with the Haemophilus influenzae type b (Hib) conjugate of Hib capsular polysaccharide and tetanus toxoid (PRP-T), and inactivated poliovirus vaccine (IPV). Methods 120 infants were enrolled and randomized to four groups to receive DTP-a at ages 2, 4, and 6 mo. At 4 and 6 mo they also received Hib conjugate and IPV, either as sep. **injections** or mixed with DTP-a. All **injections** were given i.m. in the anterolateral area of the **thigh**. Any reactions after each vaccination were noted by the parents. EIA was used to measure titers of diphtheria, tetanus, and pertussis **antibodies**, RIA for Hib anticapsular **antibodies**, and microneutralization assay for poliovirus **antibodies** from serum samples collected at the ages of 2, 4, 6, and 7 mo. Findings There were 30 infants in each group. Only mild adverse events were reported. There was a tendency towards slightly lower concns. of filamentous hemagglutinin, tetanus, and poliovirus 1 **antibodies** when the vaccines were mixed. However, there was a more pronounced difference (p=4.times.10-8) in Hib **antibodies** between groups receiving Hib capsular polysaccharide mixed with DTP-a (geometric mean concns. 0.sum.37 .mu.g/mL and 0.sum.56 .mu.g/mL) compared with groups receiving the vaccines sep. (3.sum.10 .mu.g/mL and 3.sum.94 .mu.g/mL). Interpretation Administration of premixed DTP-a, Hib conjugate, and IPV affect the immune response significantly. The mechanism of this interference is not clear. The immunogenicity of all antigens must be tested before new combinations can be accepted for vaccination programs for infants.

L4 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:248844 CAPLUS
DOCUMENT NUMBER: 130:276299
TITLE: Effects of pharmacological doses of nandrolone decanoate and progressive resistance training in immunodeficient patients infected with human immunodeficiency virus
AUTHOR(S): Sattler, Fred R.; Jaque, S. Victoria; Schroeder, E. Todd; Olson, Connie; Dube, Michael P.; Martinez, Carmen; Briggs, William; Horton, Richard; Azen, Stanley
CORPORATE SOURCE: Department of Medicine, Division of Infectious Diseases, University of Southern California School of Medicine, Los Angeles County-University of Southern California Medical Center, Los Angeles, CA, 90033, USA
SOURCE: Journal of Clinical Endocrinology and Metabolism (1999), 84(4), 1268-1276
CODEN: JCEMAZ; ISSN: 0021-972X
PUBLISHER: Endocrine Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB This nonplacebo-controlled, open label, randomized study was conducted to test the hypotheses that pharmacol. doses of nandrolone decanoate would increase lean body tissue, muscle mass, and strength in immunodeficient human immunodeficiency virus-infected men, and that these effects would be enhanced with progressive resistance training (PRT). Thirty human immunodeficiency virus-pos. men with fewer than 400 CD4 lymphocytes/mm3 were randomly assigned to receive weekly **injections** of nandrolone alone or in combination with supervised PRT at 80% of the one-repetition max. three times weekly for 12 wk. Total body wt. increased significantly in both groups (3.2.+-.2.7 and 4.0.+-.2.0 kg, resp.; P<0.001), with increases due primarily to augmentation of lean tissue. Lean body mass detd. by dual energy x-ray absorptiometry increased significantly more in the PRT group (3.9.+-.2.3 vs. 5.2.+-.5.7 kg, resp.; P = 0.03). Body cell mass by bioelec. impedance anal. increased significantly (P < 0.001) in both groups (2.6.+-.1.0 vs. 2.9.+-.0.8 kg), but to a similar magnitude (P = NS). Significant increases in cross-sectional area by magnetic resonance imaging of total **thigh** muscles (1538.+-.767 and 1480.+-.532 mm2), quadriceps (705.+-.365 and 717.+-.288 mm2), and hamstrings (842.+-.409 and 771.+-.295 mm2) occurred with both treatment strategies (P < 0.001 for the three muscle areas); these increases were similar in both groups (P = NS). By the one-repetition method, strength increased in both upper and lower body exercises, with gains ranging from 10.3-31% in the nandrolone group and from 14.4-53.0% in the PRT group (P < 0.006 with one exception). Gains in strength were of significantly greater magnitude in the PRT group (P .ltoreq. 0.005 for all comparisons), even after correction for lean body mass. Thus, pharmacol. doses of nandrolone decanoate yielded significant gains in total wt., lean body mass, body cell mass, muscle size, and strength. The increases in lean body mass and muscular strength were significantly augmented with PRT.

L21 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1997:229117 CAPLUS
DOCUMENT NUMBER: 126:292156
TITLE: Comparison of the oral, rectal, and vaginal immunization routes for induction of antibodies in rectal and **genital** tract secretions of women
AUTHOR(S): Kozlowski, Pamela A.; Cu-Uvin, Susan; Neutra, Marian R.; Flanigan, Timothy P.
CORPORATE SOURCE: Department of Pediatrics, Harvard Medical School, Children's Hospital, Boston, MA, 02115, USA
SOURCE: Infection and Immunity (1997), 65(4), 1387-1394
CODEN: INFIBR; ISSN: 0019-9567
PUBLISHER: American Society for Microbiology
DOCUMENT TYPE: Journal
LANGUAGE: English

AB To det. which mucosal immunization routes may be optimal for induction of antibodies in the rectum and female **genital** tract, groups of women were immunized a total of 3 times either orally, rectally, or vaginally with a cholera vaccine contg. killed Vibrio cholerae cells and the recombinant cholera toxin B (CTB) subunit. Systemic and mucosal antibody responses were assessed at 2-wk intervals by quantitation of CTB-specific antibodies in serum and in secretions collected directly from mucosal surfaces of the oral cavity, rectum, cervix, and vagina with absorbent wicks. The 3 immunization routes increased levels of specific IgG in serum and specific IgA in saliva to similar extents. Rectal immunization was superior to other routes for inducing high levels of specific IgA and IgG in rectal secretions but was least effective for generating antibodies in female **genital** tract secretions. Only vaginal immunization increased both specific IgA and specific IgG in both the cervix and the vagina. In addn., local prodn. of CTB-specific IgG in the **genital** tract could be demonstrated only in vaginally immunized women. Vaginal immunization did not generate antibodies in the rectum, however. Thus, generation of optimal immune responses to sexually transmitted organisms in both the rectal and the **genital** mucosae of women may require **local immunization** at both of these sites.

```
=> qaudriceps (l) injection
             0 QAUDRICEPS
        406877 INJECTION
         92372 INJECTIONS
        463598 INJECTION
                 (INJECTION OR INJECTIONS)
L1           0 QAUDRICEPS (L) INJECTION

=> thigh (l) injection
          2705 THIGH
           347 THIGHS
          2961 THIGH
                 (THIGH OR THIGHS)
        406877 INJECTION
         92372 INJECTIONS
        463598 INJECTION
                 (INJECTION OR INJECTIONS)
L2          399 THIGH (L) INJECTION

=> vaccine and L2
         36830 VACCINE
         36724 VACCINES
         46123 VACCINE
                 (VACCINE OR VACCINES)
L3           4 VACCINE AND L2

=> HIV and L2
         47566 HIV
            80 HIVS
         47573 HIV
                 (HIV OR HIVS)
L4           2 HIV AND L2

=> vergina (w) wash
            14 VERGINA
         43637 WASH
          4189 WASHES
         46964 WASH
                 (WASH OR WASHES)
L5           0 VERGINA (W) WASH

=> vergina (w) secretory
            14 VERGINA
         49829 SECRETORY
             1 SECRETORIES
         49829 SECRETORY
                 (SECRETORY OR SECRETORIES)
L6           0 VERGINA (W) SECRETORY

=> IgA and L2
         14444 IGA
            64 IGAS
         14465 IGA
                 (IGA OR IGAS)
L7           0 IGA AND L2

=> immunoglubiliin and L2
             0 IMMUNOGLUBILIIN
L8           0 IMMUNOGLUBILIIN AND L2
```

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=> antibodies and L2
        264698 ANTIBODIES
L9          16 ANTIBODIES AND L2
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```
=> herpes (w) virus
         20959 HERPES
        276723 VIRUS
         56545 VIRUSES
        286467 VIRUS
                 (VIRUS OR VIRUSES)
L11       6392 HERPES (W) VIRUS

=> L11 and vaccine
         36830 VACCINE
         36724 VACCINES
         46123 VACCINE
                 (VACCINE OR VACCINES)
L12        412 L11 AND VACCINE

=> thigh (w) injection
          2705 THIGH
           347 THIGHS
          2961 THIGH
                 (THIGH OR THIGHS)
        406877 INJECTION
         92372 INJECTIONS
        463598 INJECTION
                 (INJECTION OR INJECTIONS)
L13          6 THIGH (W) INJECTION

=> L12 and L13
L14          0 L12 AND L13

=> qaudriceps and L12
             0 QAUDRICEPS
L15          0 QAUDRICEPS AND L12

=> HSV and L13
          9255 HSV
            32 HSVS
          9257 HSV
                 (HSV OR HSVS)
L16          0 HSV AND L13

=> gonoccal and L13
             3 GONOCCAL
L17          0 GONOCCAL AND L13

=> genital and L12
          6211 GENITAL
           210 GENITALS
          6365 GENITAL
                 (GENITAL OR GENITALS)
L18         16 GENITAL AND L12

=> Genital and L13
          6211 GENITAL
           210 GENITALS
          6365 GENITAL
                 (GENITAL OR GENITALS)
L19          0 GENITAL AND L13

=> local (w) immunization
        272088 LOCAL
```

```
            28 LOCALS
        272110 LOCAL
                 (LOCAL OR LOCALS)
         32302 IMMUNIZATION
          1403 IMMUNIZATIONS
         32839 IMMUNIZATION
                 (IMMUNIZATION OR IMMUNIZATIONS)
L20         61 LOCAL (W) IMMUNIZATION

=> genital and L20
          6211 GENITAL
           210 GENITALS
          6365 GENITAL
                 (GENITAL OR GENITALS)
L21          4 GENITAL AND L20

=> muscular (w) injection
         20645 MUSCULAR
        406877 INJECTION
         92372 INJECTIONS
        463598 INJECTION
                 (INJECTION OR INJECTIONS)
L22         83 MUSCULAR (W) INJECTION

=> L22 and L21
L23          0 L22 AND L21

=> qaudriceps and L22
             0 QAUDRICEPS
L24          0 QAUDRICEPS AND L22

=> quadriceps and L22
          1231 QUADRICEPS
L25          2 QUADRICEPS AND L22

=> quadriceps (w) injection
          1231 QUADRICEPS
        406877 INJECTION
         92372 INJECTIONS
        463598 INJECTION
                 (INJECTION OR INJECTIONS)
L26          0 QUADRICEPS (W) INJECTION

=> L20 and quadriceps
          1231 QUADRICEPS
L27          0 L20 AND QUADRICEPS

=> L12 and qaudriceps
             0 QAUDRICEPS
L28          0 L12 AND QAUDRICEPS
```